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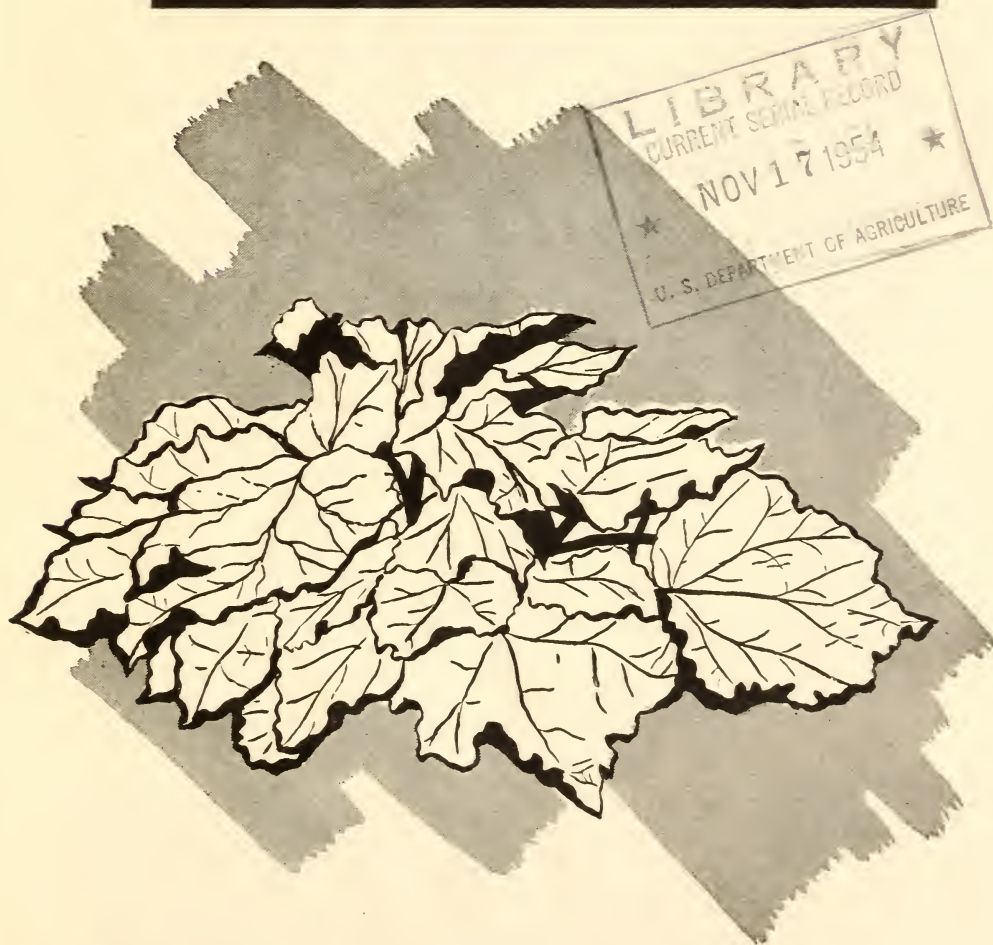
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RHUBARB PRODUCTION

Outdoors and In



Leaflet No. 354

U. S. DEPARTMENT OF AGRICULTURE

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Rhubarb Production—Outdoors and In

By VICTOR R. BOSWELL, *horticulturist, Horticultural Crops
Research Branch, Agricultural Research Service*

Our garden rhubarb, or pieplant, is believed to be native to Asia Minor. It has been a popular perennial garden vegetable in this country since its introduction late in the eighteenth century. Although rhubarb has never been a major vegetable crop in America, there is a persistent demand for it. It is grown in many home gardens, particularly in the northern half of the country.

With the recent phenomenal growth of the quick-frozen food industry, there has been a sharp increase in commercial interest in rhubarb. In the markets of many American cities frozen rhubarb has become a popular item at—surprisingly enough—the frozen-fruit counter. Before freezing the product is usually cut in $\frac{1}{2}$ -inch slices and packed in syrup in packages of about 1 pound. The 1952 pack is estimated to have been 5.7 million pounds.

Although the succulent leafstalks of rhubarb are excellent for sauces and pies, **the leaves of rhubarb must never be eaten.** The leaves contain amounts of oxalic acid and of oxalates sometimes great enough to cause fatal poisoning of those who eat them.

Outdoor Production

Climatic Requirements

Rhubarb is a cool-weather perennial plant. It does not thrive and is rarely grown in places where the summer mean temperature is much above 75° F., or where the winter mean is much above 40°. In this country it does best in the northern third and in other areas having high enough elevation to give a similarly cool climate. Rhubarb is poorly adapted to most of the southern half of the United States, and some plantings survive but a few months in the lower South.

Soils and Fertility

Rhubarb will thrive on almost any type of soil from peat or sand to heavy clay, provided it is well drained. Rhubarb grows best, however, on deep, fertile loams that are well supplied with organic matter. The plant is tolerant to soil acidity and does best on a slightly to moderately acid soil. If the crop is to be grown for the early market, a light sandy loam with a southern exposure should be selected.

Fertile land only should be selected for rhubarb culture, but it is also usually necessary to apply liberal quantities of both manure and fertilizer. As a preliminary treatment before planting, a broadcast application of 20 to 30 tons of manure and 1,500 to 2,000 pounds of a complete truck-crop fertilizer per acre is recommended. Because of the present difficulty in obtaining manure, the organic content of the

soil may be increased by growing soil-improvement crops upon it and turning them under. A fertilizer containing 5 percent of nitrogen, 8 to 10 percent of phosphoric acid, and 4 to 6 percent of potash is suitable.

In addition to this preliminary treatment, the mixing of manure with the soil under the rows or hills before planting is advisable. It is also desirable to make annual applications of manure and fertilizer. From 15 to 20 tons of manure and 1,000 pounds of a 5-10-5 fertilizer per acre are usually sufficient. On highly organic soils, such as peat and muck, it is possible to grow good rhubarb without manure, but liberal applications of fertilizer each season are necessary. If manure is not available, 1,500 to 2,000 pounds per acre of a 5-10-5 fertilizer should be applied together with about 200 pounds of nitrate of soda or equivalent amount of nitrogen in sulfate of ammonia or ammonium nitrate.

Propagation and Planting

Rhubarb should be propagated by planting pieces obtained by dividing the crowns formed during the preceding seasons. These pieces are obtained by cutting down through the crown, between the buds, or "eyes," so as to leave as large a piece of storage root as possible with each large bud. The pieces should be protected from excessive drying before they are planted.

Crowns should be divided and new plantings established when a planting has borne for about 4 years unless the production of numerous small stalks indicates that the crowns are becoming crowded with small buds, thus necessitating earlier division. If, under very favorable conditions, stalk production and quality remain satisfactorily high, renewal of the planting may be deferred.

In the northernmost districts, where severely cold weather strikes relatively early after the growing season, the division of crowns and planting are best done in early spring. In districts of less severe winters and longer autumn seasons, the work may be done in autumn after the tops have been killed by the first freezes.

Propagation by seed is not recommended because rhubarb seedlings do not come true to the type of the parent plants.

Crown pieces are usually transplanted at 3-foot intervals in furrows about 4 feet apart—a planting rate of about 4,000 pieces per acre. They are covered with 2 to 3 inches of soil. The soil should be pressed firmly about the entire piece.

Varieties

The old varieties Victoria and Linnaeus are perhaps best known. Several new varieties, however, are becoming increasingly popular because of their more attractive red stalks. Among these are the Canadian varieties McDonald and Ruby. Strawberry and Cherry Red are popular in the Pacific Coast States. The new red varieties have somewhat more slender stalks than Victoria.

Cultivation

Shallow cultivation often enough to control weeds thoroughly is all that is required. Soon after the ground is frozen it is well to cover the rows with strawy manure. In many cases an application

of strawy manure is made to the rows during the early spring. Manure or mulch should be raked off the rows and worked into the soil in early spring. Leaving a heavy mulch over the rows delays early growth because it prevents the sun's rays from warming the soil.

Diseases and Insects

Foot rot is the most serious disease affecting rhubarb. It is caused by a fungus which attacks and rots the base of the stalks, causing them to fall over. The disease often kills the plants. The best remedy available where this disease occurs is to remove the affected plants and to spray the bases of stalks in healthy hills with bordeaux mixture.

One insect—the rhubarb curculio—may cause damage to rhubarb plants. This is a rusty snout beetle about three-fourths of an inch long. It bores into the stalks, crowns, and roots. It also attacks the wild dock which may grow in the vicinity. This insect may be kept in control by hand picking, by burning all infested plants, and by destroying all the wild dock growing in the neighborhood of the rhubarb patch in July, after the beetles have laid their eggs.

Harvesting

No leafstalks should be pulled from plants that are to be used for forcing. For field harvest none should be pulled the first year from newly set plants, and only a few should be removed the second year. The commercial rhubarb season is short, rarely extending over more than 2 months. Only the largest and best stalks should be harvested. The leafstalks separate readily from the crown and are easily harvested by grasping them near the base and pulling slightly to one side in the direction in which the stalk extends. The smaller stalks are often thinned somewhat to permit better development of those remaining. After the harvest season the plants are allowed to grow as they will, except for the removal of the seedstalks. These should be cut off as soon as they arise, in order to conserve the energy of the plant for the production of foliage and roots.

A heavy crop of rhubarb in any year depends to a large extent on the strong leaf growth of the year before. Yields of 10 to 12 tons per acre per year are common.

Indoor Production

The term "forcing" of rhubarb means the growing of rhubarb stalks during the winter from large crowns that have been taken from the field into a house or other shelter that can be suitably heated. Rhubarb forcing is confined chiefly to those Northern States where the climate is best for the field production of large, vigorous crowns—the large underground stems with attached large storage roots. Stalks of forced rhubarb are more tender and delicately colored than those of the field-grown crop. The product is most commonly available from about Christmastime until early spring.

Field Production for Forcing

Climatic and soil requirements, fertilizers, and propagation and cultural practices are the same for rhubarb plants that are to be

forced as for those to be harvested in the field. Generally, plants for forcing are grown for that purpose alone; therefore, no stalks are harvested from them during their short life in the field. Crowns grown two full summers in the field under favorable conditions are large enough for forcing. Three-year-old crowns are not superior to 2-year-old crowns for forcing, if the cost of producing the crowns is considered.

Growth of crowns in the field largely determines their potential value for forcing. Large crowns with a few large, strong buds are preferred to those with small or weak buds. Large fancy stalks cannot be developed from small, weak buds.

Those who force rhubarb year after year divide the crowns of a suitable part of their older plantings for establishing one new planting every year in order to have 2-year-old crowns available each autumn. Crowns from fields that are several years old or that have been harvested heavily are not recommended for forcing. They will produce relatively low yields of stalks of inferior market quality.

Forcing Structures

Houses about 30 feet wide and 100 to 120 feet long are common, although other sizes are also employed. These houses are usually of wood, having side walls about 3 to 3½ feet high, with a ridge 2 to 3 feet higher through the middle. A row of purlin posts with scantling purlins is placed on either side of the ridge, about halfway between the ridge and the side walls. The end walls are removable, so that a vehicle can be driven through the house between the lines of posts when bringing in or taking out the roots. In most cases the houses are not sufficiently high to permit driving through without removing the roof boards. These roof boards rest on the side walls and ridge-pole and are covered with straw, manure, corn fodder, sod, or other material for the purpose of excluding light and conserving heat. Ordinarily these boards are not placed in position until shortly before heat is to be applied. The floor is of soil.

Some growers dismantle the forcing house each spring, store the lumber, and set it up over a new area of soil each autumn. Most growers use houses of a more permanent character.

Greenhouses are sometimes used for forcing, but this practice is no longer very common. Greenhouse-forced rhubarb is similar in appearance to that produced in the field. Dark structures are preferred because of the quality of stalk produced in them. In cellars or other structures containing windows, the windows should be almost completely blacked out. If light is present, the stalks will bend toward it, becoming so curved as to make them unattractive and difficult to pack for market.

Forcing structures may be heated by any convenient means. Small coal stoves were formerly in common use (1 stove for about 1,000 square feet of floor space), with long runs of stovepipe inside the house to help distribute the heat. Such installations, however, waste expensive fuel and manpower. Hot-water furnaces with long runs of heat-radiating pipe are much more efficient and have displaced stoves to a considerable extent.

Crowns for the Forcing House

When top growth of rhubarb in the field stops in autumn, the crowns—strictly speaking, the buds on the crowns—go into a rest period of many weeks. No satisfactory stalk production can be expected until the rest period is over. Exposure of the crowns to temperatures near freezing, or below, for about 6 weeks will bring them out of the rest period so they will grow when given the proper temperatures in the forcing house. Hard freezing for a few days is not sufficient to bring crowns out of the rest. Hard freezing does not harm the crowns, but neither does it benefit them.

Crowns for forcing may be plowed out at any time that the soil can be worked after the tops have died in autumn. A large plow should be run deeply under the rows so that the crowns will be turned out with a large mass of storage roots and with a minimum of injury. The commonest practice is to plow out the crowns soon after the tops are dead. The crowns are then left lying in the rough soil as they were turned out until it is convenient or necessary to put them into the forcing structure. They must, of course, be moved before extreme winter weather stops all field work.

Where weather permits, the plowed-out crowns are left exposed to low temperature in the field for about 4 to 6 weeks. In places, however, where heavy early snow or extreme freezing might interfere, the crowns are rather promptly placed in the *cold* forcing structure, exactly as they are to stand during forcing. The crowns are then kept cold, even frozen, until their rest period is over and it is desired to start the heat. The "knock-down" type of structure described in the section, Forcing Structures, was developed to afford exposure of the bedded crowns to low temperature as well as to afford protection and heat at the proper time.

Crowns bedded before chilling has been completed and those bedded afterward are handled alike. They are set on the earth floor of the house as close together as practicable, the spaces about them are filled with soil, and the soil is watered. Crowns require, on the average, 1 square foot of bed space each. Narrow aisles may be left at about 5-foot intervals.

Forcing Temperatures

When the total period of chilling of the bedded crowns reaches about 6 weeks, the house may be closed and mild heat applied. If, however, it is planned to start forcing relatively late, to avoid exhausting the crowns before the end of the desired forcing season, the crowns can be left cold as long as desired. Cold exposure longer than 6 weeks does no harm.

The best yields are obtained at a forcing temperature range close to 60° F. Lower temperatures give more intense pink color in the stalks, increasing their attractiveness, but cause undesirably slow growth. At temperatures as low as 50° growth is so slow as to result in low total yields. Above 60° the stalk color becomes paler than at lower temperatures, and the growth rate is faster. Above 65°, however, and especially above 70° the total yields are lower than when 60° is maintained. At temperatures around 70° or higher the crowns become exhausted before they have produced a large crop and the quality of

the crop is inferior. Considering both quality and yield, a house temperature between 55° and 60° is believed to be best.

Good results have been obtained experimentally with bottom heat supplied by electric hotbed heating cable with a house temperature of 50° F. and a bed temperature of 55°. Bed temperatures of 65° or more have been shown to decrease yields and greatly increase power consumption. Humidity should be kept very high in the house.

Watering the Beds

Watering to keep the soil moderately moist (as in a good workable condition) helps to maintain good growth without impairing color or other quality of the stalks. Production falls off sharply in beds that become dry. To the extent that watering favors growth and increases yield it necessarily also hastens exhaustion of the crowns. As the crowns become gradually exhausted, stalk color becomes gradually less intense.

Harvesting and Preparing for Market

Harvesting normally is begun about a month after the heat is applied. Duration of harvesting depends on many factors, especially on the character of the crowns and the forcing temperature. The harvesting period generally extends over 2 or 3 months. Stalks are harvested when 18 or more inches long. They are washed and packed, usually in attractive cartons holding either 2 or 5 pounds each. These cartons are sent to market in "master" corrugated cardboard boxes containing 50 pounds net.

Yields vary widely, but good growers obtain an average of about 2½ pounds per crown, or 2½ to 3 pounds per square foot of bed.

Home Forcing

The above-described principles and methods can be adapted to the forcing of a few plants in a suitable home basement or cellar. A half dozen or so good crowns is enough for the average family. Suitable temperature will not be too difficult to provide, but the humidity of heated modern basements is likely to be undesirably low.



